Electropneumatic Positioner Type 4763

SAMSON



Fig. 1 · Type 4763

Mounting and Operating Instructions

EB 8359-2 EN

Edition September 2004

CE Ex FM APPROVED

Contents

- *Assembly, start-up and operation of the device may only be performed by trained and experienced personnel familiar with this product.*
  According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.
- *Explosion-protected versions of this device may only be operated by personnel who have undergone special training or instructions or who are authorized to work on explosion-protected devices in hazardous areas.*
- *Any hazards which could be caused by the process medium, the signal pressure and moving parts of the control valve are to be prevented by means of the appropriate measures.*
- *If inadmissible motions or forces are produced in the actuator as a result of the level of the supply air pressure, this must be restricted by means of a suitable pressure reducing station.*
- *Proper shipping and appropriate storage are assumed.*

- ***Note!** The device with a CE marking fulfils the requirements of the Directives 94/9/EC (ATEX) and 89/336/EEC (EMC).*
  The declaration of conformity can be viewed and downloaded on the Internet at http://www.samson.de.

Versions

Positioner	Type	4763-	x	0	1	x	0	0	x	x	x	x	0
Explosion protection	Without		0										
	Ⓔx II 2 G EEx ia IIC T6 acc. to ATEX		1										
	Ex ia CSA/FM		3										
	Ⓔx II 3 G EEx nA II T6 acc. to ATEX		8										
Range spring	1					1							
	2					2							
	3					3							
Pneumatic connections	G ¼								1				
	¼ NPT								3				
Electrical connections	M 20 x 1.5 blue									1			
	M 20 x 1.5 black									2			
	Harting connector									5			
Reference variable	4 to 20 mA										1	1	
	0 to 20 mA										2	2	
	1 to 5 mA										2	3	

Controlled variable (travel)	7.5 to 60 mm, with 90 mm lever extension	
Reference variable	4 bis 20 mA Ex Internal resistance R_i at 20 °C approx. 250 Ω ± 7 %	
Split-range 0 to 50 % or 50 to 100 %	4 bis 20 mA not Ex Internal resistance R_i at 20 °C approx. 200 Ω ± 7 % 0 to 20 mA	
Reference variable span (up to 50 mm travel)	The data specified in the Certificate of Conformity must be taken into consideration for devices with type of protection EEx II C.	
Range spring	See table on page 14 for selection	
Supply air	1.4 to 6 bar (20 to 90 psi) Air quality as per ISO 8573-1: Max. particle size and density: Class 4 Oil contents: Class 3, Pressure dew point: Class 3	
Signal pressure p_{st} (output)	Max. 0 to 60 bar (0 to 90 psi)	
Characteristic	Linear characteristic Deviation from terminal-based conformity: ≤ 1.5 %	
Hysteresis	< 0.5 %	
Sensitivity	< 0.1 %	
Operating direction	Reversible	
Proportional band X_P at 1.4 bar supply air	1 to 3 % with spring 1 and 2 1 to 1.5 % with spring 3	
Air consumption in steady state X_P = 1 %	With 1.4 bar supply air: 0.19 m_n^3/h	With 6 bar supply air: 0.5 m_n^3/h
Air delivery	At Δp 1.4 bar: 3.0 m_n^3/h	At Δp 6 bar: 8.5 m_n^3/h
Transit time with Type 3271 Actuator, stem extends	240 cm^2 ≤ 1.8 s · 350 cm^2 ≤ 2.5 s · 700 cm^2 ≤ 10 s	
Permissible ambient temperature	–20 to 70 °C –35 to 70 °C for devices with metal cable entry –45 to 70 °C special version Version with oxygen as operating medium up to max. 60 °C Specifications in Certificate of Conformity additionally apply for Ex devices	
Influences	Temperature: < 0.03 %/1 K Supply air: < 0.3 %/0.1 bar Vibration: < 2 % between 10 to 150 Hz and 4 g Effect when turned by 180°: < 3.5 %	
Degree of protection	IP 54, special version: IP 65	
Weight	Approx. 1.2 kg	
Materials	Case: Die-cast aluminum, chromated and plastic-coated External parts: Stainless steel	

1 Design and principle of operation

The electropneumatic positioner is used for the correlation between the valve stem position (controlled variable x) and the input signal (reference variable w) received from the controller. In this case, the input signal accepted from the control device is compared to the travel (valve stem position) of the control valve, and a pneumatic signal pressure (output variable y) is delivered.

The positioner consists of an i/p converter unit (21) and the pneumatic section including the lever (1), shaft (1.1) and range spring (6), plus the control system composing nozzle, flapper and booster. The input signal (e.g. 4 to 20 mA) is directly fed to the i/p converter unit and converted to a proportional air pressure signal p_e. Any change of the input current signal causes a proportional change of the air pressure p_e sent to the pneumatic control system.

The air pressure p_e, in turn, produces a force which acts on the surface of the measuring diaphragm (8) and is compared to the force of the range spring (6). The motion of the diaphragm (8) is transferred to the flapper (10.2) via the feeler pin (9.1), and the nozzle (10.1) releases pressure. Any change of either the air pressure p_e or the valve stem position causes the pressure to change in the booster (12) connected downstream of the nozzle. The signal pressure p_{st} which is released causes the plug stem to assume a position based on the input signal.

The adjustable volume restriction Q (14) and Xp (gain) restriction (13) are used to optimize the control loop. The range spring (6), which can be exchanged, is assigned to both the rated valve travel and the nominal voltage of the input signal.

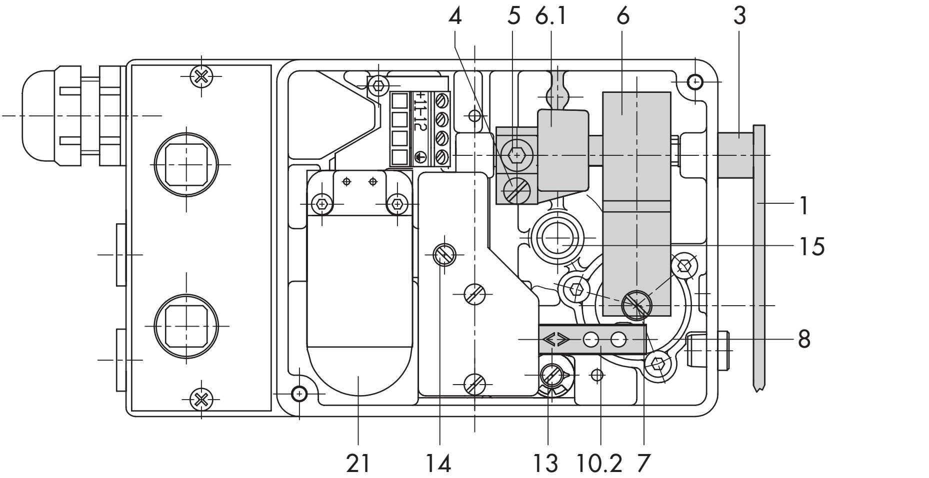
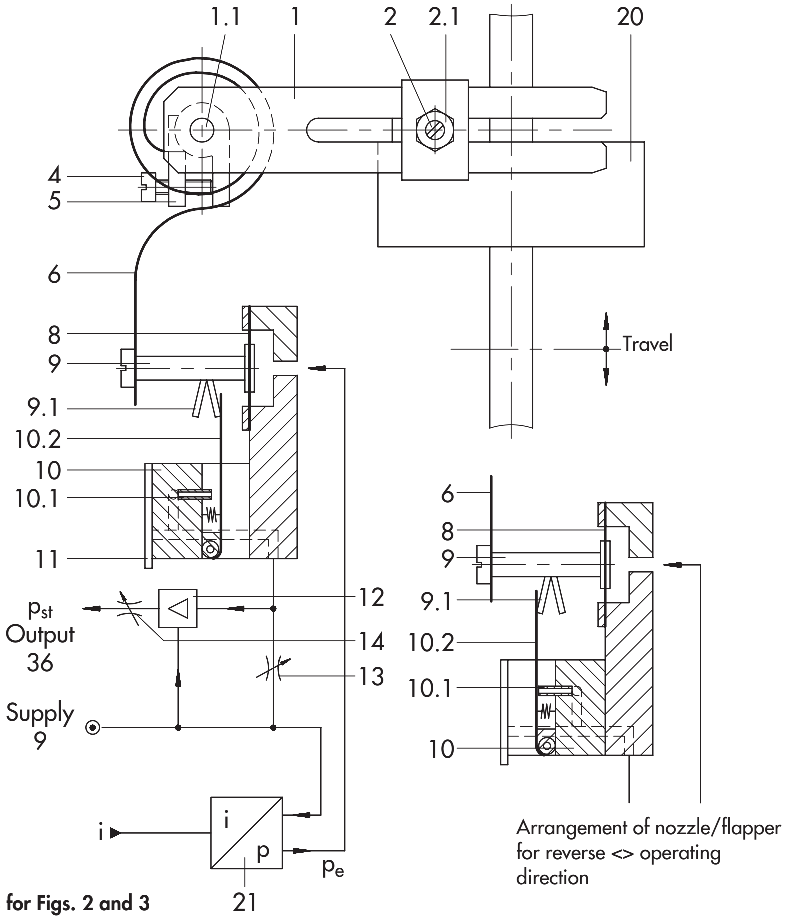


Fig. 2 · Positioner with cover removed



Legends for Figs. 2 and 3

1 Lever for valve travel
1.1 Shaft
2 Pin
2.1 Nut
3 Sleeve
4 Zero adjustment screw
5 Mounting screw
6 Range spring
6.1 Bracket
7 Mounting screw
8 Measuring diaphragm
9 Diaphragm plate
9.1 Feeler pin
10 Nozzle block
10.1 Nozzle
10.2 Flapper
11 Cover plate
12 Booster
13 X_P restriction
14 Volume restriction Q
15 Borehole for mounting screw
20 Plate
21 i/p converter unit

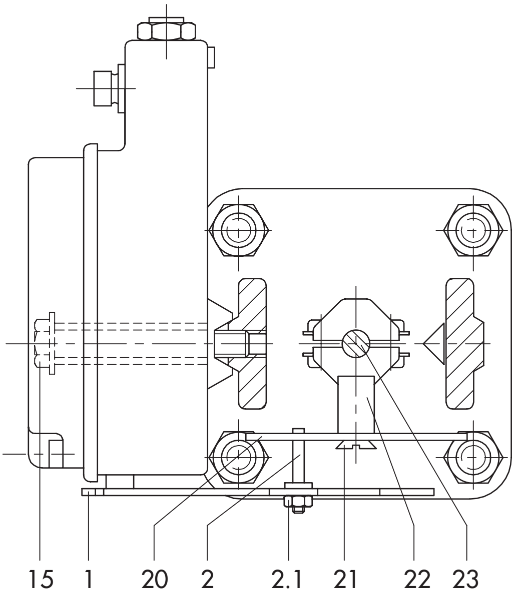
Fig. 3 · Functional diagram

2 Attachment

To attach the positioner to valves with cast yokes, mounting parts (order no. 1400-5745) are used. For valves with rod-type yokes (pillars), the mounting kit (order no. 1400-5745) and additionally the mounting kit (order no. 1400-5342) are necessary (see also accessories table on page 19).
Since the positioner can be attached on either side of the valve, the physical location (left or right attachment) should be determined before actual attachment (see corresponding Figs. 7 to 10 in section 4.1).

2.1 Attachment to valves with cast yokes

1. Fasten the plate (20) to the stem connector clamps (22) of the valve using the screws (21).
2. Unscrew the positioner cover, and secure the device to the valve yoke using the mounting screw (15). Make sure that the pin (2) is led inside the wire strap and therefore clamped against the plate (20).



Legends for Figs. 4 and 5:

1	Lever
2	Pin
2.1	Nut
15	Mounting screw
20	Plate
21	Screw
22	Stem connector
23	Plug stem
24	Travel indicator
26	Clamping plate
27	Valve pillars
28	Support

Fig. 4 · Attachment to valves with cast yokes (NAMUR rib)

2.2 Attachment to valves with rod-type yokes

1. Screw the plate (20), off-centered, to the travel indicator (24) of the plug stem (23) using the screws (21).
2. Place both the support (28) and the clamping plate (26) on the pillar (27) and lightly fasten. Move the support until both the center of the plate (20) and the support (28) are aligned at half the valve travel.
3. Screw tight the support and clamping plate.
4. Mount the positioner to the support using the mounting screw (15). Make sure that the pin (2) is led inside the wire strap and therefore clamped against the plate (20).

2.3 Cover of the positioner case

After attaching the positioner, make sure that the vent plug on the cover of the positioner case points downwards after the valve has been installed.

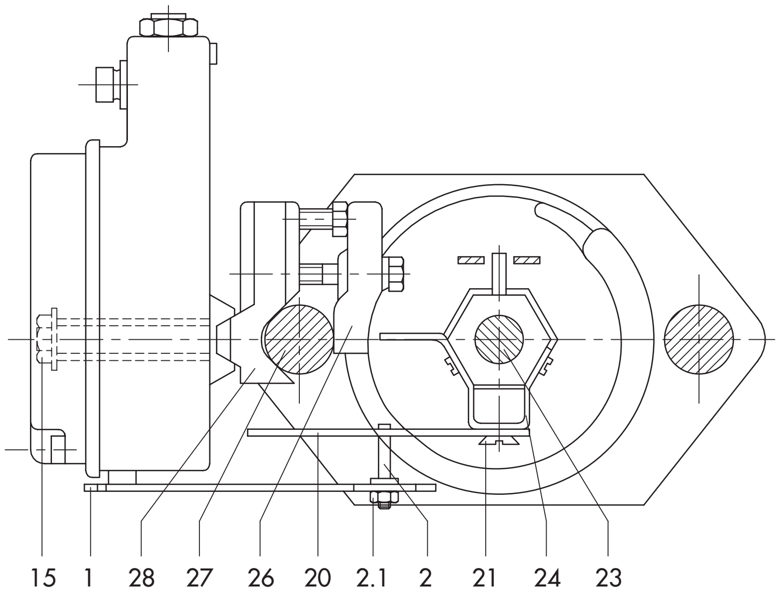


Fig. 5 · Attachment to valves with rod-type yokes

3 Connections

3.1 Electrical connections

For electrical installation, you are required to observe the relevant electrotechnical regulations and the accident prevention regulations that apply in the country of use. In Germany, these are the VDE regulations and the accident prevention regulations of the employers' liability insurance association.
The following standards apply for installation in hazardous areas:
EN 60079-14: 2003 (VDE 0165 Part 1) ***"Electrical apparatus for explosive gas atmospheres"*** *and*
EN 50281-1-2: 1999 (VDE 0165 Part 2) ***"Electrical apparatus for use in the presence of combustible dust"****.*
For the interconnection of intrinsically safe electrical equipment, the permissible maximum values specified in the EC type examination certificate apply (U_i or U_0; I_i or I_0; P_i or P_0; C_i or C_0, and L_i or L_0).

Note for Zone 2 and Zone 22 equipment :
For EEx nA equipment (non-sparking apparatus), the standard EN 50021: 1999 specifies that connecting, interrupting, or switching circuits while energized is only allowed during installation, maintenance or repair work.
For EEx nL equipment (energy-limited apparatus), the standard EN 50021: 1999 allows this type of equipment to be switched under normal operating conditions.

Caution!
The terminal assignment specified in the certificate must be adhered to. Reversing the assignment of the electrical terminals may cause the explosion protection to become ineffective!
Do not tamper with enameled screws inside or on the housing.

Note on the selection of cables and wires:
To install intrinsically safe circuits, observe section 12 of the standard EN 60079-14: 2003 (VDE 0165 Part 1). To run multi-core cables or lines with more than one intrinsically safe circuit, section 12.2.2.7 of this standard applies.
An additional cable gland can be installed when connecting the device over two separate cables. Cable entries left unused must be sealed with blanking plugs. Devices used at ambient temperatures down to –40 °C must have metal cable entries.

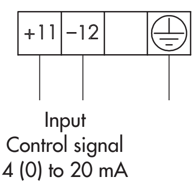


Fig. 6 · Electrical connection

The wiring for the input signal is led using cable glands to the terminals 11 (+) and 12 (–). The ground connection can be connected inside or outside of the positioner case.

The following accessories are available:
Cable gland M 20 x 1.5
Black Order no. 1400-6985
Blue Order no. 1400-6986
Adapter M 20 x 1.5 to ½ NPT:
Aluminum, powder-coated
Order no. 0310-2149

3.2 Pneumatic connections

The pneumatic connections are designed as tapped holes with ¼ NPT or ISO 2228/1-G ¼ thread. The conventional male connections for metal and copper pipes (or plastic hoses) can be used.

Note!
The supply air must be dry and free of any oil and dust. Always observe the maintenance instructions applicable to the connected pressure reducing stations. Blow out air lines thoroughly before connecting them.

3.2.1 Pressure gauges

We recommend attaching pressure gauges for the supply air and signal pressure in order to monitor the positioner. The parts are listed as accessories in the table on page 19.

3.2.2 Supply pressure

The required supply pressure is determined by the bench range and the operating direction (fail-safe action) of the actuator. The bench range is written on the nameplate as spring range or signal pressure range depending on the type of actuator. **FA** (actuator stem extends) or **FE** (actuator stem retracts) or a symbol indicates the operating direction.

Actuator stem extends (FA)

Fail-safe position **"Valve CLOSED"**
(for globe and angle valves)

Required supply pressure =
Upper bench range value + 0.2 bar, minimum 1.4 bar.

Actuator stem retracts (FE)

Fail-safe position **"Valve OPEN"**
(for globe and angle valves)

The required supply pressure for a tight-closing valve is roughly estimated from the maximum signal pressure pst_{max}:

$$pst_{max} = F + \frac{d^2 \ddot{Y} p \ddot{Y} Dp}{4 \ddot{Y} A} \text{ [bar]}$$

d = Seat diameter [cm]
Δp = Differential pressure at the valve [bar]
A = Actuator diaphragm area [cm^2]
F = Upper range value of the actuator

In the absence of such specifications, proceed as follows:

Required supply pressure =
Upper bench range value + 1 bar

The positioner output pressure is led to the top or bottom diaphragm case of the actuator as shown in Figs. 7 to 10.

4 Operation

4.1 Combining positioner and actuator

The arrangement of the actuator, input signal, operating direction and mounting location is schematically represented in Figs. 7 to 10.
Each subsequent change such as reversal of the control loop's operating direction or field reversing the actuator version from direct "Actuator stem extends" to reverse "Actuator stem retracts" or vice versa also involves changing the mounting location of the positioner.

4.1.1 Determining/reversing the operating direction

(Figs. 7 to 11)

When the input signal (reference variable w) increases, the signal pressure p_{st} can either be increasing (direct operating direction <<) or decreasing (reverse operating direction <>).
The same applies to a decreasing input signal; the output pressure either decreases (direct operating direction <<) or increases (reverse operating direction <>).

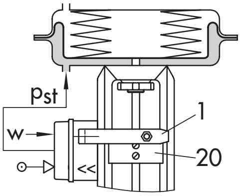
Symbols are located on the flapper (10.2) which identify the respective operating directions (direct << or reverse <>).

Depending on the flapper position, the adjusted operating direction is marked with the corresponding symbol. If the operating direction of the required function does not match the symbol or if the operating direction is to be changed, proceed as follows:

1. Remove both screws of the cover plate, and lift off the nozzle block (10) along with the cover plate.
2. Reinstall the nozzle block turned 180° together with the cover plate, and screw tight.
   Make sure that the nozzle block and flapper are correctly located above or below the feeler pin (9.1) as shown in Fig. 11.

If the operating direction is to be changed after the initially determined arrangement of positioner and actuator, note that the positioner must be mounted in a different location and the nozzle block must be turned. Always consider the location of the lever (1) and the plate (20), "lever on top of plate" or reversed "plate on top of lever" as shown in Figs. 7 to 10.

Actuator: Stem extends (FA)



Lever (1) on top of plate (20)

Fig. 7 · Operating direction << Left attachment

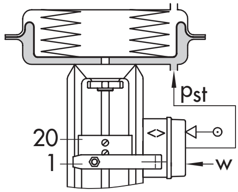


Plate (20) on top of lever (1)

Fig. 8 · Operating direction <> Right attachment

Actuator: Stem retracts (FE)

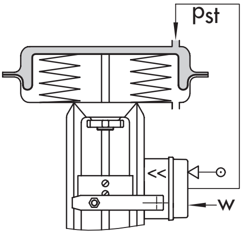


Fig. 9 · Operating direction << Right attachment

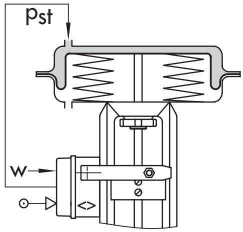
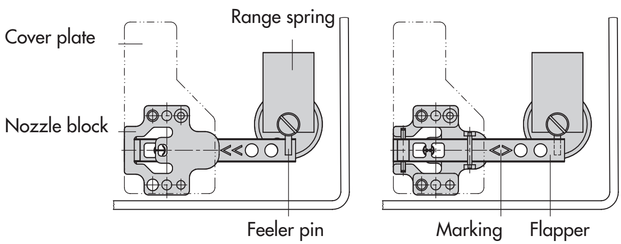


Fig. 10 · Operating direction <> Left attachment



Operating direction increasing/increasing (direct <<)
feeler pin on top of flapper

Op. direction increasing/decreasing (reverse <>)
flapper on top of feeler pin

Fig. 11 · Position of nozzle block, cover plate removed

4.2 Starting point and input signal (reference variable)

The attached lever and the installed range spring of the positioner are assigned to the values of rated valve travel (mm) and the input signal (% reference variable) as in the table below.
In standard operation, the reference variable span is 100 % = 16 mA. A smaller span of, for example, 50 % = 8 mA is only required for split-range operation (Fig. 13). The span can be changed by exchanging the range spring (section 4.4). On making adjustments to the positioner, the travel must be adapted to the input signal and vice versa.
With a 4 to 20 mA input signal, for example, the valve must also move through the entire range (0 to 100 %). The starting point

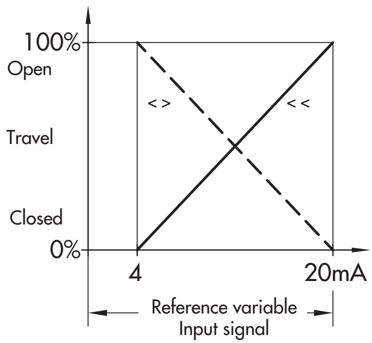


Fig. 12 · Standard operation

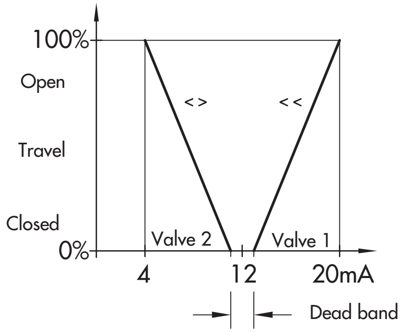


Fig. 13 · Split-range operation, two valves operating in opposing directions

Rated travel [mm]	Min./max. travel [mm]	Reference variable (input signal)	Range spring
Standard travels for SAMSON valves with lever I (40 to 127 mm long)			
15	7.5 to 15	100 % 50 %	1 2
30	14 to 32	100 % 50 %	2 3
60	30 to 70	100 %	3
Additional travel ranges with lever I and lever extension (40 to 200 mm long)			
20	7.5 to 26	100 % 50 %	1 2
40	14 to 50	100 % 50 %	2 3
> 60	30 to 90	100 %	3

then is 4 mA and the upper range value 20 mA.
In split-range operation, the controller output signal used to control two control valves is divided in such a way that these valves move through their entire travel with half of the input signal range (e.g. first valve set to 4 to 12 mA, second valve set to 12 to 20 mA). To prevent the two from overlapping, a dead band of ±0.5 mA as in Fig. 13 must be taken into account.

The starting point (zero) is adjusted using the zero adjustment screw (4), the reference variable span and, hence, the upper range value using the pin (2).

4.3 Setting the positioner at the valve

- Connect an ammeter to the control signal input at the terminals 11 (+) and 12 (–).
- Connect the supply air to the supply input (supply 9).

4.3.1 Setting the air delivery (volume restriction Q) and proportional band X_P

1. Close the volume restriction (14) as far as the required speed of response allows.
   You can check the speed of response by pressing the range spring (6) as far as it will go.
2. Set the input signal to approximately 50 % of its range. Then, turn the zero adjustment screw (4) until the valve is at approximately 50 % valve travel.

On setting the X_p restriction, observe the relationship with the supply air pressure as indicated in Fig. 14. The preset value of X_p should read approximately 3 %.

3. Check the plug stem's tendency to oscillation by pressing the range spring (6) briefly as far as it will go.
   X_p should be set to a value as small as possible, however, without causing noticeable overshoot.

Note!
Always determine the X_p setting prior to adjusting the starting point. Subsequent modification displaces the zero point!
The zero can also be shifted by altering the adjusted supply air pressure.
If necessary, check the zero adjustment under operating conditions of the plant and, re-adjust, if need be.

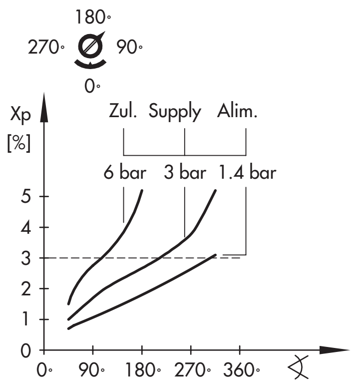


Fig. 14 · Setting the X_p restriction

4.3.2 Setting actuator version "Stem extends"

Note!
To ensure that the total closing force of the actuator can be effective in the control valve, the diaphragm chamber must be completely vented at the lower range value of the reference variable (operating direction <<) and at the upper range value (operating direction <>).
Therefore, set input signal to a slightly increased starting point of 4.5 mA when the operating direction is direct << and to a slightly lowered starting point of 19.5 mA when the operating direction is reverse <>. This applies in particular to controllers and control systems whose output signal is limited to a range of 4 to 20 mA.

Starting point (zero) e.g. 4.5 mA

1. Turn the zero adjustment screw (4) until the plug stem just begins to move from the resting position (observe plug stem with travel indicator).
2. Reduce the input signal on the ammeter and increase again slowly. Check whether the plug stem starts moving at a starting point of 4.5 mA and, if necessary, correct.

Upper range value (span) e.g. 20 mA

3. After the starting point has been adjusted, increase the input signal. The plug stem must be motionless at an upper range value of exactly 20 mA and therefore already moved through 100 % of its travel range (watch the travel indicator at the valve!). If the upper range value is incorrect, the pin (2) must be moved as follows in order to correct the signal:
4. Move pin to:
   End of lever –> to increase travel
   Pivot –> to reduce travel
   Whenever you correct the input signal, re-adjust zero afterwards. Subsequently, check the upper range value.

Repeat until the two values match.

4.3.3 Setting actuator version "Stem retracts"

Note!:
For actuator version "Actuator stem retracts", the diaphragm chamber must be loaded with a pressure that is capable of tightly closing the control valve, even with prevailing upstream pressure in the plant. This concerns an upper range value of the input signal corresponding to 20 mA (direct operating direction <<) or a lower range value corresponding to 4 mA (reverse operating direction <>).

The required signal pressure is indicated on the adhesive label on the positioner or is roughly estimated as in section 3.2.2 on page 11.

Starting point (zero) e.g. 20 mA

1. Adjust the input signal to a starting point of 20 mA on the ammeter.
   Turn the zero adjustment screw (4) until the control valve just begins to move from the initial position.

2. Increase the input signal and slowly reduce to a starting point of 20 mA again. Check if the valve begins to move at exactly 20 mA.
   Correct deviation using the zero adjustment screw (4); turning it counterclockwise moves the control valve earlier from its final position and clockwise later.

Upper range value (span) e.g. 4 mA

3. After adjusting the starting point, adjust the input signal to an upper range value of 4 mA using the ammeter. With an upper range value of exactly 4 mA, the plug stem must be motionless and therefore already moved through 100 % of its travel range (watch the travel indicator at the valve!).
4. If the upper range value is incorrect, the pin (2) must be moved to correct the signal.
   Adjust 20 mA and turn the zero adjustment screw (4) until the **required signal pressure** is indicated on the pressure gauge.
   By way of substitution for a pressure gauge, set 19.5 mA as the starting point.

4.4 Exchanging the range spring

If the range is to be altered or changed to split-range operation, replace the range spring as shown in Fig. 3 as follows:

1. Remove screw (7) on the range spring. Pull out hexagon socket screw (5) and the lever together with shaft.
2. Exchange range spring. Slide lever with shaft through sleeve (3), positioner case and bracket (6.1).
3. Secure range spring with the screw (7).
4. Move bracket and shaft until the screw (5) sits on the flattened part of the shaft. Tighten screw (5). Allow for a play from 0.05 to 0.15 mm between the lever (1) and the sleeve (3) as well as between the range spring (6) and the positioner case.

5 Conversion from electropneumatic to pneumatic positioner

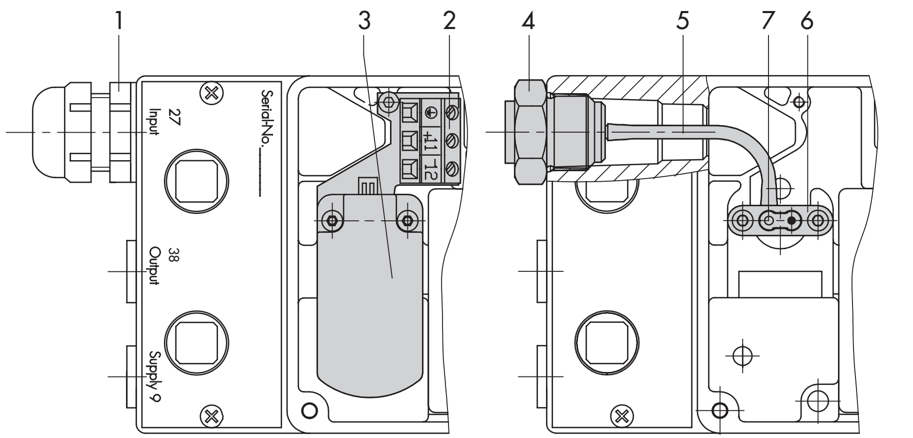
The appropriate conversion kit allows the electropneumatic positioner to be converted into a Type 4765 Pneumatic Positioner.

Note!
EB 8359-1 EN then applies for the converted Type 4765 Pneumatic Positioner.

Required conversion kit for model index **.02.** or lower
for G threaded connection
Order number 1400-6724
for NPT threaded connection
Order number 1400-6725

Required conversion kit for model index **.03.** or higher
for G threaded connection
Order number 1400-6795
for NPT threaded connection
Order number 1400-6796

1. Undo mounting screws and lift the i/p converter unit together with the printed circuit board out of the positioner case.
2. Remove screw gland (1). Plug on hose (5) and screw the connecting nipple (4) of the conversion kit tightly on the case.
3. Insert sealing element (7) into connecting plate (6) and screw tight in the case.
4. Push the free end of the hose onto the connecting plate (6).



1	Screw gland
2	Printed circuit board
3	i/p module
4	Connecting nipple
5	Hose
6	Connecting plate
7	Sealing element

Fig. 15 · Converting the positioner

6 Servicing explosion-protected devices

If a part of the positioner on which the explosion protection is based needs to be serviced, the positioner must not be put back into operation until an expert has inspected the device according to explosion protection requirements, has issued a certificate stating this or given the device a mark of conformity.

Inspection by an expert is not required if the manufacturer performs a routine check on the device prior to putting it back into operation. The passing of the routine check must be documented by attaching a mark of conformity to the device.

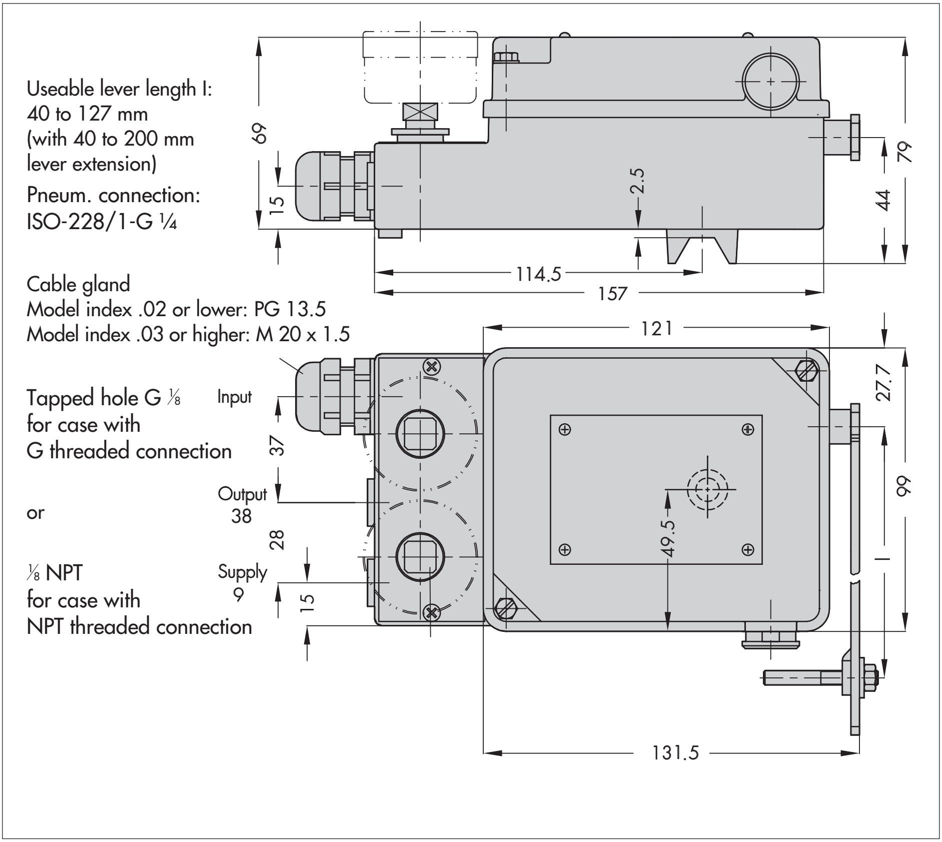
Explosion-protected components may only be replaced by original, checked components from the manufacturer.

Devices that have already been used outside of hazardous areas and are intended for use in hazardous areas in future must comply with the safety demands placed on repaired devices. Prior to operation, they must be tested according to the specifications stipulated for "Repairing explosion-protected devices".

7 Accessories and mounting parts

Accessories – Mounting parts	Order number
Range spring 1 Range spring 2 Range spring 3 Lever I Lever extension Pressure gauge attachment Pressure gauge attachment, free of copper	1190-0736 1190-0737 1190-0738 1690-6469 1400-6716 1400-6950 1400-6951
Mounting kit for valves with cast yoke acc. to NAMUR Mounting kit for valves with rod-type yokes acc. to NAMUR for rod diameters 18 to 35 mm	1400-5745 1400-5745 and 1400-5342
Spare parts assortment with seals and diaphragms	1400-6792
Conversion kit to upgrade to degree of protection IP 65 (refer to Samsomatic print Z 900-7 for more details)	1790-7408

8 Dimensions in mm



Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

TRANSLATION

(1) **EC TYPE EXAMINATION CERTIFICATION**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 02 ATEX 2078

(4) Equipment: Model 4763-1.. I/P Positioner

(5) Manufacturer: SAMSON AG, Mess- und Regeltechnik

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

(7) This equipment and any acceptable variations thereof are specified in the schedule to this certificate.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 in according to Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres as specified in Annex II to the Directive.

The examination and test results are recorded in confidential report **PTB-Ex 02-22054**.

(9) The Essential Health and Safety Requirements are satisfied by compliance with

EN 50014: 1997+A1+A2 **EN 50020: 1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) Accroding to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of the equipment.

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

(12) The marking of the equipment shall include the following:

Ex **II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz Braunschweig,19. July 2002
By order

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirketor

EC Type Examination Certificates without signature and seal are invalid.
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

(13) **Schedule**

(14) **EC TYPE EXAMINATION CERTIFICATE No. PTB 02 ATEX 2078**

(15) **Description of Equipment**

The Model 4763-1.. I/P Positioner is intended for attachment to pneumatic control valves. It serves for converting control signals of (0)4...20 mA or 1...5 mA from a controlling system into a pneumatic actuating pressure of 6 bar max. For auxiliary power non-combustible media are used.

The i/p converter circuit is a passive two-terminal network which may be connected to any certified intrinsically safe circuit, provided the permissible maximum values of U , I and P are not exceeded.

The device is intended for use inside and outside of hazardous locations.

The correlation between version, temperature classification, permissible ambient temperature ranges and maximum short-circuit currents is shown in the table below:

Version 4763-1...1. with Model 6109 I/P Module

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	-45 °C ... 60 °C	85 mA
T5	-45 °C ... 70 °C	
T4	-45 °C ... 80 °C	
T5	-45 °C ... 70 °C	100 mA
T4	-45 °C ... 80 °C	

Version 4763-1...2. with Model 6112 I/P Module

Temperature class	Permissible ambient temperature range	Maximum short-circuit current
T6	-45 °C ... 60 °C	85 mA or
T5	-45 °C ... 70 °C	100 mA
T4	-45 °C ... 80 °C	120 mA

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

Electrical data

Signal circuit (terminals 11/12)

Type of protection: Intrinsic safety EEx ia IIC only for connection to a certified intrinsically safe circuit

Maximum values:

U_i = 28 V
I_i = 110 mA or 85 mA
P_i = 0.7 W
or
U_i = 25 V
I = 120 mA
P_i = 0.7 W
C_i = negligible
L_i = negligible

(16) **Test Report PTB Ex 02-22054**

(17) **Special conditions for safe use**

None

(18) **Essential Health and Safety Requirements**

In compliance with the standards specified above.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 19. July 2002

(Signature) (seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

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Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt., Bundesallee 100, D-38116 Braunschweig

Ptb29-4763.doc

TRANSLATION

(1) **Statment of Conformity**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 03 ATEX 2183 X

(4) Equipment: Model 4763-8 I/P Positioner

(5) Manufacturer: Samson AG

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

(7) This equipment and any acceptable variation therefor are specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 in according to Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report

PTB Ex 03-23304

(9) The Essential Health and Safety Requirements are satisfied by compliance with

EN 50021: 1999

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) In compliance with the Directive 94/9/EC this Statement of Conformity relates only to the dessign and consturciton of the equipment specified. Further requirements of this Directive apply to manufacture and marketing of this equipment.

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

(12) The marking of the equipment shall include the following:

Ex **II 3 G EEx nA II T6**

Zertifizierungsstelle Explosionsschutz — Braunschweig, 30 September 2003
By order

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirketor

EC Type Examination Certificates without signature and seal are invalid.
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included. Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig Ptb29 Ex n.doc

(13) **S c h e d u l e**

(14) **Statement of Conformity PTB 01 ATEX 2170 X**

(15) **Description of Equipment**

The Model 4763-8... I/P Positioner is intended for attachment to pneumatic control valves. It serves for converting control signals of (0)4 . . .20mA or 1 . . . 5mA from a controlling system into a pneumatic actuating pressure of 6bar max.

For pneumatic auxiliary power non-combustible media are used.

The device is intended for use inside and outside of hazardous areas...

The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissible ambient temperature range
T6	-45°C . . . 60°C
T5	-45°C . . .70°C
T4	-45°C . . . 80°C

Electrical data

Signal circuit (terminals 11/12) Type of protection: EEx nA II

(16) Test report: **PTB Ex 03-23304**

(17) **Sepcial conditions for safe use**

The signal circuit (terminals 11/12) shall be preceded with by a fuse installed outside of the hazardous area.
This fuse shall comply with IEC 60127-2/II, 250V F, or with IEC 60127-2/VI, 250V T, with a fuse nominal current I_N of ≤ 50mA max.

The positioner shall be mounted in an enclosure providing at least Degree of Protection IP 54 in compliance with the IEC Publication 60529.
This requirement applies also to the cable entries and/or plug connectors.

The wiring shall be connected in such a manner that the connection facilities are not subjected to pull and twisting.

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

Schedule of the Statement of Conformity

(18) **Basic health and safety requirements**

Are satisfied by compliance with the standard specified above.

Zertifizierungsstelle Explosionsschutz Braunschweig,
By order

(Signature) (seal)

Dr. Ing. U. Johannsmeyer

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This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig Ptb29 Ex n.doc

Installation Manual for Apparatus for Use in Hazardous Locations in Compliance with CSA Approval

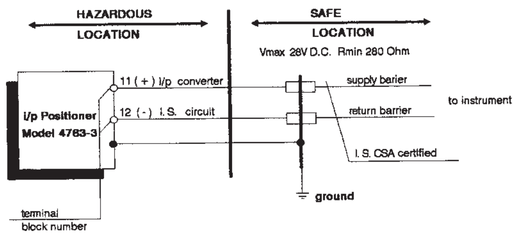
Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

i/p positioner max. values

$V_{max} \leq 28$ V	Ci - OnF
$I_{max} \leq 100$ mA	Li - 0μH
$R_{min} \geq 280\ \Omega$	

Intrisically safe when installed as specified in manufacturer's installation manual.

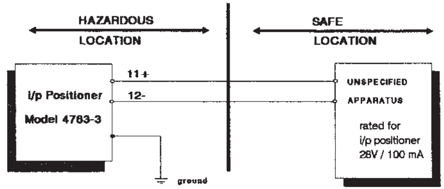
CSA certified for Hazardous Locations:
Class I, Division 1, Groups A, B, C, D.



Cable entry:

Cable entry Pg 13,5 or metal conduit according to drawing No. 1150-6928 T or drawing No. 1150 - 6016 T-4.

CSA certified for Hazardous Locations:
Class I, Division 2, Groups A, B, C, D.



Cable entry:

Cable entry only rigid metal conduit according to drawing No. 1150-6016 T-4.

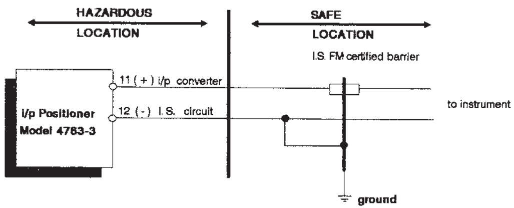
Installation Manual for Apparatus for Use in Hazardous Locations in Compliance with FM - Approval

Class I, II, III Division 1
Groups A, B, C, D, E, F and G

The apparatus may be installed in intrinsically safe circuits when used with an FM-approved intrinsically safe barrier.
Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

i/p positioner max. values

V_{max} ≤ 28 V	Ci - OnF
I_{max} ≤ 100 mA	Li - 0µH
R_{min} ≥ 280 Ω	

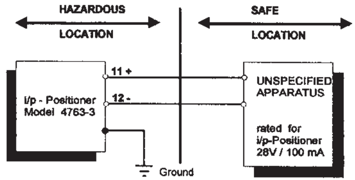


Cable capacitance plus the capacitance of the intrinsically safe apparatus shall be less than the capacitance marked on any associated apparatus used. The same requirements apply to inductance.

Cable entry:

Cable entry Pg 13,5 or metal conduit according to drawing No. 1150-6928 T or drawing No. 1150 - 6016 T-4.

FM certified for hazardous Locations:
Class I, II, III Division 2, Groups A, B, C, D, E, F + G.



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